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(Pages : 2)

Name JR EDUCATOR

FOURTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 2009

PTCS CS 2K 403—THEORY OF COMPUTATION

Time: Three Hours

lading (Ward x 1)

Maximum: 100 Marks

## Partia example of the partial of the

Answer all questions.

ing State and equipmentalities to become

- (a) State the pigeonhole principle. Give an example.
- (adam (b) What do you mean by regular expression? Give an example:
- Define A context free grammar.
  - (d) Define a Push Down Automata.
  - (e) Explain the closure properties of context free grammar.
  - (f) List the properties of recursive and recursively enumerable languages.
  - (g) Explain why resolution is used in propositional calculus.
  - (h) State and explain Herbrand expansion.

 $(8 \times 5 = 40 \text{ marks})$ 

## Part B

II. (a) (i) Explain countable sets and uncountable sets with examples.

(5 marks)

Given the Language L as, L:  $\left\{ \left[ (a+b)^* \ ab \ (a+b)^* \right] \cap L((ab))^* \right\}$ . Construct the DFA.

(10 marks)

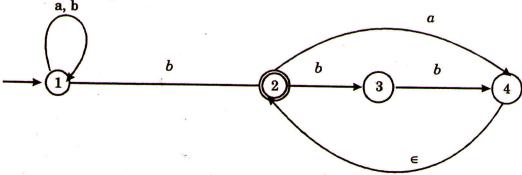
Or

(b) (i) Explain Myhill-Nerode theorem.

(8 marks)

(ii) Convert the following NFA to a regular expression:

Show all steps in the conversion:



(7 marks)
Turn over

C 58252 III. (a) (i) Show that Post correspondence problem is unsolvable. (8 marks) (ii) What do you mean by class P and class NP? Give examples. (7 marks) ETH SEMENIER BITTOIL (ENGINEERING) TEGREFE (b) (i) Explain Ambiguous CFLs. Give examples. (8 marks) (ii) Explain Cook's Theorem. (7 marks) IV. (a) Explain pumping lemma with an example. (b) Explain the equivalence of LBA and CSG. elgorou elodinesse un etare (15 marks) V. (a) (i) State and explain compactness theorem for propositional calculus. (8 marks) (ii) State and explain Resolution theorem. commerce of marks) Period (7 marks) Or(b) Find the Prenex forms of the following formulas: (i)  $(\exists \forall x P xy \lor \forall x R xy)$ . (c) Explain why resolution is used in unicognitional call (h). State and explain Herbrash expension (ii)  $\forall x (Px \rightarrow \exists y Rxy)$ .

Find functional forms of

(8 < 5 = 40 marks)

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 $\forall x \forall y \exists z ((Pxy \land PYZ) \rightarrow PXZ)$ .

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(15 marks)

 $[4 \times 15 = 60 \text{ marks}]$ 

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Show all steps in the converse

(ii) Convert the following AFT to a cogniar expression